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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/596,919

06/29/2006

Tae-Hee Cho

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EXAMINER

NGUYEN, COLETTE B

ART UNIT

PAPER NUMBER

1793

MAIL DATE

DELIVERY MODE

07/28/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/596,919	<b>Applicant(s)</b> CHO ET AL.	
	<b>Examiner</b> COLETTE NGUYEN	<b>Art Unit</b> 1793	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 May 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 3-15 and 27-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2 and 16-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06/29/06 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Applicant's election with traverse of Species 2: **claims 16-26 and generic claims 1 and 2 in the reply filed on 05/20/09** is acknowledged. The traversal is on the ground(s) that there is no burden for search. This is not found persuasive because the application is a PCT application and per PCT Rule 13.1, these species are deemed to lack unity of invention because they are not so linked as to form a single general inventive concept. The requirement is still deemed proper and is therefore made FINAL.
2. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Specification***

The examiner has not checked the specification to the extent necessary to determine the presence of all possible minor errors (grammatical, typographical and idiomatic). Cooperation of the applicant(s) is requested in correcting any errors of which applicant(s) may become aware of in the specification, in the claims and in any future amendment(s) that applicant(s) may file. Applicant(s) is also requested to complete the status of any copending applications referred to in the specification by their Attorney Docket Number or Application Serial Number, if any.

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The status of the parent application(s) and/or any other application(s) cross-referenced to this application, if any, should be updated in a timely manner.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claim 1** is rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al. (US2002/0098397). Chen discloses a fuel cell stack with an anode, a cathode and an electrolyte membrane comprising a fuel supply unit to the anode, an air supplying unit to the cathode and a heating unit (catalytic reactor) to preheat the fuel supplied to the fuel cell stack. (para 4-8 and 23)

5. **Claims 1, 2 16, 17 and 26** are rejected under 35 U.S.C. 102(e) by Petillo et al. (US7,282,0730).

6. **Regarding claims 1 and 2.** Petillo discloses method of dispensing fuel solids such as powder, pellets and granules, on demand for fuel cell system using sodium borohydride (NaBH<sub>4</sub>). The fuel cell stack including an anode, a cathode and electrolyte membrane with fuel supplying unit to supply hydrogen to the anode, an air supplying

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unit to supply air to the cathode, a heating unit for heating fuel (Unit 100) supplied to the fuel cell with a gas/liquid separator (unit 108). (Fig 1 and col 1,2 and col 5, ln 54-60)

7. Regarding claim 16 and 26. Petillo discloses a method to dispense solid fuel, (NaBH<sub>4</sub>) to a fuel supply unit for fuel cell wherein the fuel powder reacting with water generated heat. (col 2, ln 9-40).

8. Regarding claim 17. Petillo discloses a heating unit of claim 16 with a container for storing fuel powder (unit 101, col 3, ln 45), an open/close unit(unit 102 , col 3, ln 47-62)

### ***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

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11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. **Claim 2** is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al. (US2002/0098397) as applied to claim 1 above, and further in view of Wariishi et al. (US2003/0054224). Chen discloses a fuel cell stack as discussed above in claim 1. He is silent about a gas/liquid separator. Wariishi et al discloses a fuel cell stack with gas/liquid separator wherein the moisture of the reactant is controlled and water is separated and recycled, resulting in a simplified cell structure and size reduction.(para 16-19 and 51 and fog 3 and 4). It would have been obvious for one of ordinary skill in the art at the time of the invention to add the separator of Wariishi to Chen's fuel cell stack with a heating unit so the fuel cell stack can be more efficient and the liquid can be balanced as water management in fuel cell is critical for performance.

13. **Claims 18 to 25** are rejected under 103(a) as unpatentable over Petillo et al. (US7,282,073),

14. **Regarding claims 18 to 25.** Petillo (073) discloses a method of "fuel supply on demand" to generate hydrogen via hydrolysis of  $\text{NaBH}_4$  for fuel cell application by

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dispensing fuel solids (powders, pellets and granules) in response to a predetermined condition and mixed with water. The dispensing units have valves and actuators to control the dispensing of the powders, timers to open and close valves so moisture cannot entrain into the fuel powder storage. As for the type of dispensers, Petillo discloses that there are non-limiting examples for the solid fuel component dispenser, in terms of material of construction, structure, arrangements, powder dispensing valves. (col 7, ln 1-67), He does not disclose all the features of the dispenser as claimed however, it would have been obvious for one of ordinary skill in the art at the time of the invention to modify the teachings and incorporate all the disclosed features such as the valves, the spring, the seals the cylinder shape, etc, to come up with a powder dispensing unit that Petillo has clearly detailed in col 7.

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US6,939,529 and 6,746,496.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to COLETTE NGUYEN whose telephone number is (571)270-5831. The examiner can normally be reached on Monday-Thursday, 10:00-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curt Mayes can be reached on (571)-272-1234. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/COLETTE NGUYEN/  
Examiner, Art Unit 1793

July 26, 2009

/Melvin Curtis Mayes/  
Supervisory Patent Examiner, Art Unit 1793